



Some notes on Rhopaloceran diversity (Lepidoptera) of Himachal Pradesh

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Abstract

Twenty-eight species of nineteen genera belonging to three families of butterfly from fifteen localities were collected and identified. The collection record, old distribution alongwith host plants were given.

Keyword: Diversity, Family, Genera, Lepidoptera.

Introduction

Moths, butterflies and skippers belong to the order Lepidoptera generally with two pairs of membranous wings which, together with the body, are more or less clothed with tiny scales, often brightly colored. It is the second largest order after Coleoptera in the class Insecta, whose number is roughly equivalent to that of known flowering plant species (Holloway *et. al* 1992). There are about 2,00,000 species of Lepidoptera world over and out of these, only 15,000 species belong to the butterflies (Rhopalocera) and the remaining being moths (Herterocera). Collection, preservation and studying of Lepidoptera are a tedious work due to their fast flying nature and due to this the same has been neglected from India for the last many years. District Una is selected for the present research work which is situated in shivalik range of Himalaya. It lies within North Latitude 31° 21' and 31° 50' and East Longitudes 71° 55' and 76° 28', altitude 750 metres and South-Western part of Himachal Pradesh. The hill ranges are covered by scanty vegetation comprising mostly of shrubs. The authors have undertaken survey-cum-collection tour to the 15 localities such as Dehlan, Bangana, Gagret, Raipur, Mubarkpur, Bharwain, Haroli, Una, Amb, Chintpurni, Daulatpur, Basoli, Santokhgarh, Chauki Maniar, and Lathiani of the Una district of Himachal Pradesh were visited between during different seasons from March to August, 2008. The survey led to the collection of 28 species, out of which 02 belong to family Papilionidae and 13 each to family Nymphalidae and Pieridae were identified and studied in detail

Materials and Methods

The adults of butterflies were collected with the help of insect collection net (circumference 93 cm, handle length 87 cm, bag depth 77 cm) by sweeping

method. These methods were quite suitable for collection of butterflies over the leaves and flowers (Arora, 1990). Rhopaloceran collected were killed in killing bottle by using liquid chemicals like ethyl acetate, carbon tetrachloride etc. The specimens collected from various localities were pinned with different sizes entomological pins (38mm x 40mm; 38mm x 55mm) and stretching in spreading board boxes (40cm x 30cm x 10cm) or on plastazote pasted/ fixed at the bottom of a slide box. The stretched specimens were stored in well fumigated (naphthalene balls) air tight wooden show cases. The label carrying information such as locality, date of collection, altitude and name of the collector etc. was tagged with each specimen. The preparation of wings slide were undertaken as per Common (1970) and Zimmerman (1978). The taxonomic procedure involves an examination of various morphological characters such as head, labial palpus, legs, wing shape, wing maculation and wing venation. Except wing venation, the rest of the characters have been directly examined from the dried specimens. For naming of each vein Comstock-Needham system (Miller, 1970) has been followed. The photographs of the adults of different species were taken with the help of digital camera (Nikon D200).

Observation

Preliminary sorting and taxonomic segregation was done with the help of literature Moore, 1865, 1866-68, 1880-87, 1890, 1896- 1899; de Niceville, 1881; de Niceville and Marshall, 1882, 1886, 1890; Hampson, 1892, 1895, 1918; Bingham, 1905, 1907; Bell, 1911; Talbot, 1939; Wynter-Blyth, 1957; Common, 1970; D'Abrerra, 1980-86, 1998; Arora, 1990; Holloway, *et al.*

1992; Varshney, 1993, 1994, 1997, 1998; Rose and Sidhu, 1994, 1996, 1997a, 1997b, 1999, 2001; Rose and Sharma, 1995a, 1995b, 1998a, 1998b, 1998c, 1998d, 1999, 2000a, 2000b, 2000c; Gunatheraj *et al.*, 1998; Trigunayat, 1999; Yakovlev and Nakonechnyi, 2001; Rose and Walia, 2003; Bhaskaran and Eswaran, 2005; Thakur *et al.*, 2006; Uniyal, 2007 and Withrington and Veronik 2008 and after comparison of adults from our national Museum at FRI, Dehradun and IARI, New Delhi. In all, twenty-eight species belonging to nineteen genera i.e., *Aglais* Dalman, *Anosia* Hübner, *Ariadne* Horsfield, *Hypolimnas* Hübner, *Junonia* Hübner, *Lethe* Hübner, *Morpho* Fabricius, *Neptis* Fabricius, *Pyronia* Hübner, *Satyrus* Westwood of family Nymphalidae, *Papilio* Linnaeus of family Papilionidae and *Atella* Doubleday, *Catopsilia* Hübner, *Cepora* Billberg, *Colias* Fabricius, *Delias* Hübner, *Eurema* Hübner, *Ixias* Hübner, *Pieris* Schrank of family Pieridae were identified. All the collected species have been deposited in the Taxonomy Laboratory, Department of Entomology, Punjab Agricultural University, Ludhiana. Taxonomic segregation of butterflies recorded in this study was based on the morphological details as presented below.

Superfamily Papilionoidea

Family: Nymphalidae

Diagnosis: Head vertex very smooth, labial palpi three segmented, upcurved, maxillary palpi one segmented, haustellum naked, antennae filiform, clubbed, antennal pecten absent, ocelli absent, chaetosemata present, tympana absent, venation variable, wing coupling absent, forewing pterostigma absent, forewing chorda absent, forewing anal veins A_{1+2} forewing cell vein absent, hindwing pterostigma absent, hindwing anal veins A_{1+2} A_3 , hindwing cell vein absent, epiphysis absent, tibial spurs zero in forelegs and two each in midlegs and hindlegs.

I. Genus: *Aglais* Dalman

Aglais Dalman, 1816, *K.Vet.Acad.Handl. Stockh.*, (1): 56.

Aglais urticae rizana (Moore)

Vanessa urticae rizana Moore, 1872, *Proc. Zool Soc. Lond.*: 559.

Material examined: Himachal Pradesh: Distt. Una; Raipur, 545m, 2.viii. 2008, 2 ♀, 1♂, Bharwain, 708m, 17.viii.2008, 1 ♀, 2♂, coll. Anita Kumari.

Distribution: Sikkim, Himalayas (www.nhm.ac.uk); Himalayas from Kashmir to Sikkim (Bingham, 1905); Bharwain, Raipur (H.P.) (present study).

Larval host Plant: Unknown.

II. Genus: *Anosia* Hübner

Anosia Hübner, 1816, *Verz. bekannt. Schmett.* (1):15-16.

Anosia chryssippus Linnaeus

Anosia chryssippus Linnaeus, 1758, *Syst.Nat. (Edn.x)*: 471.

Material examined: Himachal Pradesh: Distt. Una; Chauki Maniar, 530m, 5.vii. 2008, 1 ♂, Haroli, 375m, 1.viii.2008, 2 ♀, coll. Anita Kumari.

Distribution: Griechenland (Inseln) (www.nhm.ac.uk.); Southern Europe, Syria, Ethiopian Region, Arabia, Persia and Afghanistan (Bingham, 1905); Chauki maniar, Haroli (H.P.), (present study).

Larval host Plant: *Calotropis gigantea* (Bingham, 1905).

III. Genus: *Ariadne* Horsfield

Ariadne Horsfield, 1829, *Cat.Lep.Ins.Mus.E. India.Co.*: 3.

Ariadne merione tapestrina (Moore)

Ergolis merione tapestrina Moore, 1884 *J.A.S.B. Liii.*: 19.

Material examined: Himachal Pradesh: Distt. Una; Dehlan, 374m, 4.viii. 2008, 1 ♀, 1♂, coll. Anita Kumari.

Distribution: India (www.nhm.ac.uk.); the northern half of continental India, Shimla to Sikkim in the Himalayas, Rajputana, Bengal, Assam, Burma, Tenasserim, Malayan subregion (Bingham, 1905); Dehlan, (H.P.), (present study).

Larval host Plant: *Tragia cannabina* and *T. involucrata* (Bingham, 1905).

IV. Genus: *Hypolimnas* Hübner

Hypolimnas Hübner, 1819, *Verz. bekannt. Schmett.*: 45.

Hypolimnas missippus missippus Linnaeus

Hypolimnas missippus missippus Linnaeus, 1764, *Mus. Ulr.*: 264.

Material examined: Himachal Pradesh: Distt. Una; Haroli, 375m, 1.viii. 2008, 2 ♂, coll. Anita Kumari.

Distribution: Regio Indica, Africa, Australia, Guiana (www.nhm.ac.uk.); in Himalayas upto 6000 feet; extending to the Malayan subregion and China, (Bingham, 1905); Haroli (H.P.), (present study).

Larval host Plant: *Portulaco oleracea* (Bingham, 1905).

V. Genus: *Junonia* Hübner

Junonia Hübner, 1819, *Verz. bekannt. Schmett.*: 34, 35.

Junonia almana almana (Linnaeus)

Junonia almana almana Linnaeus, 1758, *Syst. Nat.*: 472, n.89.

Material examined: Himachal Pradesh: Distt. Una; Una, 370m, 21.v. 2008, 1 ♀, 2 ♂; Santokhgarh, 378m, 1.iv. 2008, 1 ♀, coll. Anita Kumari.

Distribution: India, China (www.nhm.ac.uk); Una, Santokhgarh (H.P.), (present study).

Larval host Plant: *Mimulis gracilis*, Rice crop (Bingham, 1905).

***Junonia atlites atlites* (Linnaeus)**

Precis atlites atlites Linnaeus, 1763, *Amoen. Acad.* 6: 407, n.72.

Material examined: Himachal Pradesh: Distt. Una; Gagret, 472m, 1.vi. 2008, 2 ♂, coll. Anita Kumari.

Distribution: India, China, Java (www.nhm.ac.uk); Gagret (H.P.), (present study).

Larval host Plant: Unknown.

***Junonia lemonias lemonias* (Linnaeus)**

Precis lemonias lemonias Linnaeus, 1758, *Syst. Nat.*: 473.

Material examined: Himachal Pradesh: Distt. Una; Bangana, 573m, 17.v. 2008, 1 ♀, 1 ♂; Chauki maniar, 530m, 5.viii. 2008, 3 ♀; Dehlan, 374m, 4.viii. 2008, 2 ♀, coll. Anita Kumari.

Distribution: Regio Indica. (www.nhm.ac.uk); Bangana, Chauki maniar, Dehlan (H.P.), (present study).

Larval host Plant: Unknown.

***Junonia orithya* Linnaeus**

Junonia orithya Linnaeus, 1764, *Mus. Ulr.*: 278. **Material examined:** Himachal Pradesh: Distt. Una; Daulatpur, 436m, 24.iii. 2008, 1 ♀, 2 ♂; Amb, 484m, 5.iv.2008, 3 ♀, 1 ♂; Bangana, 573m, 17.v.2008, 1 ♀, 4 ♂, coll. Anita Kumari.

Distribution: Regio, Indica, Africa, (www.nhm.ac.uk.) India, Ceylon, Assam, Burma, Tenasserim, China and the Malayan Subregion (Bingham, 1905); Daulatpur, Amb, Bangana (H.P.), (present study).

Larval host plant: Amaranthus, Sweet Potato (Bingham, 1905).

VI. Genus: *Lethe* Hübner

Lethe Hübner, 1819, *Verz. bekannt. Schmett.*: 56.

***Lethe europa nudgara* Fabricius**

Lethe europa nudgra Fabricius, 1775, *Syst. Ent.*: 500.

Material examined: Himachal Pradesh: Distt. Una; Bharwain, 708m, 17.viii. 2008, 3 ♂, coll. Anita Kumari.

Distribution: Jawa, Bawean, Kagean, Nias, Philippinen (www.nhm.ac.uk.); the plains of northern India, lower hill of the Himalayas, Assam, Burma, Tenasserim, extending to China and the Malay Peninsula (Bingham,

1907); Bharwain (H.P.), (present study).

Larval host Plant: Unknown.

VII. Genus: *Morpho* Fabricius

Morpho Fabricius, 1807, *Ill. Mag.* 6:280.

***Morpho perseus perseus* (Cramer)**

Mycalesis perseus perseus Cramer, 1779, *Pap. Ex.* 1:71.

Material examined: Himachal Pradesh: Distt. Una; Amb, 484m, 5.iv. 2008, 1 ♀; Bangana, 573m, 17.v.2008, 1 ♀; Haroli, 375m, 1.viii.2008, 2 ♀, coll. Anita Kumari.

Distribution: Himalayas, Kangra to Sikkim, Bhutan, Bengal, Southern India, Ceylon, China and Malayan Subregion (Bingham, 1905); Amb, Bangana, Haroli (H.P.), (present study).

Larval host Plant: Grasses (Bingham, 1905).

VIII. Genus: *Neptis* Fabricius

Neptis Fabricius, 1807, *Ill. Mag.* 6 :282.

***Neptis hylas astola* Linnaeus**

Neptis hylas astola Linnaeus, 1758, *Syst. Nat. (Edn.x.)*: 486.

Material examined: Himachal Pradesh: Distt. Una; Daulatpur, 436m, 24.iii. 2008, 1 ♀, 1 ♂; Chintpurni, 710m, 7.v.2008, 1 ♀, coll. Anita Kumari.

Distribution: India (www.nhm.ac.uk.); Western and east Himalayas, Khasis Hills, and Upper Burma (Moore, 1890); Daulatpur, Chintpurni (H.P.), (present study).

Larval host Plant: Large flower Mexican clover (Moore, 1890).

IX. Genus: *Pyronia* Hübner

Pyronia Hübner, 1816, *Verz. bekannt. Schmett.*: 59.

***Pyronia kashmirensis* (Ruhl)**

Vanessa kashmirensis Ruhl, 1894, *Pal Grossschmett.*: 596.

Material examined: Himachal Pradesh: Distt. Una; Mubarakpur, 490m, 15.iii. 2008, 2 ♀, 3 ♂; Daulatpur, 436m, 24.iii.2008, 4 ♀, 1 ♂, coll. Anita Kumari.

Distribution: The Himalayas from Kashmir to Sikkim (Bingham, 1905); Mubarkpur, Daulatpur (H.P.), (present study).

Larval host Plant: Unknown.

X. Genus: *Satyrus* Westwood

Satyrus Westwood, 1851, *Cen. diurn. Lep.* 2: 72.

***Satyrus swaha* (Kollar)**

Aulocera swaha Kollar, 1844, *Hugel's Kashmir*, 4: 444.

Material examined: Himachal Pradesh: Distt. Una; Mubarkpur, 490m, 15.iii. 2008, 2 ♀; Bangana, 573m, 17.v. 2008, 3 ♀, coll. Anita Kumari.

Distribution: Sikkim, Tschitral (www.nhm.ac.uk) Himalayas from Kashmir to east Kumaun (Bingham, 1905); Mubarkpur, Bangana (H.P.), (present study).

Larval host Plant: Wild blue Iris (different grasses), (Bingham, 1905).

Family: Papilionidae

Diagnosis: Head vertex very smooth, labial palpi three segmented, upcurved, maxillary palpi one segmented, haustellum naked, antennae filliform, clubbed, antennal pecten absent, ocelli absent, chaetosemata present, tympana absent, venation variable, wing coupling absent, forewing pterostigma absent, forewing chorda absent, forewing anal veins A_1A_2 . forewing cell vein absent, hindwing pterostigma absent, hindwing anal veins A_{1+2} , hindwing cell vein absent, epiphysis present, tibial spurs zero in forelegs and midlegs and two in hindlegs.

XI. Genus: *Papilio* Linnaeus

Papilio Linnaeus, 1758, *Syst. Nat.*, (*Edn.x*): 458.

Papilio demoleus demoleus Linnaeus

Papilio demoleus Linnaeus, 1758, *Sept. Nat.* (*Edn.x*): 464, n.35.

Material examined: Himachal Pradesh: Distt.Una; Dehlan, 374m, 4.viii. 2008, 5 ♂; Bangana, 573m, 17.v. 2008, 3 ♀, 5 ♂, coll. Anita Kumari.

Distribution: China, Eainan, Tonkin, N.S.India, Ceylon, Perain (www.nhm.ac.uk); Ceylon, India, Northern Burma, Persia, Arabia (Bingham, 1907); Dehlan, Bangana (H.P.), (present study).

Larval host Plant: Citrus (Bingham, 1907).

Papilio polytes nikobarus Linnaeus

Papilio polytes Linnaeus, 1758, *Syst. Nat.* (*Edn. x*): 460, n 7.

Material examined: Himachal Pradesh: Distt. Una; Gagret, 472m, 1.vi. 2008, 1 ♀, 1 ♂; Raipur, 545m, 2.viii. 2008, 2 ♀, 4 ♂, coll. Anita Kumari.

Distribution: Liu-Kiu, Formosa, China, Eainan, Tonkin, Ceylon, Perain (www.nhm.ac.uk) Andamans (Bingham, 1907); Gagret, Raipur (H.P.), (present study).

Larval host Plant: Citrus, Murraya, Triphasia, Xanthoxylon (Talbot, 1939).

Family: Pieridae

Diagnosis: Head vertex very smooth, labial palpi three

segmented, upcurved, maxillary palpi absent, haustellum naked, antennae filliform, clubbed, antennal pecten absent, ocelli absent, chaetosemata present, tympana absent, venation variable, wing coupling absent, forewing pterostigma absent, forewing chorda absent, forewing anal veins A_{1+2} . forewing cell vein absent, hindwing pterostigma absent, hindwing anal veins $A_{1+2}A_3$, hindwing cell vein absent, epiphysis present, tibial spurs zero in forelegs and two each in midlegs hindlegs.

XII. Genus: *Atella* Doubleday

Atella Doubleday, 1847, *Gen. D. Lep.* (1). 165.

Atella phlantha phlantha Horsfield

Atella phalantha phalantha Horsfield, 1829, *Cat Lep. E. Ind. Comp.*: 7.

Material examined: Himachal Pradesh: Distt. Una; Basoli, 398m, 31.vii. 2008, 5 ♀, 2 ♂; Raipur, 545m, 2.viii. 2008, 2 ♀, 1 ♂, coll. Anita Kumari.

Distribution: Throughout Continental India, Ceylon, Assam, Burma, Tenasserin, China, Japan and the Malayan Subregion (Bingham, 1905); Basoli, Raipur (H.P.), (present study).

Larval host Plant: *Flacourtia* species (Bingham, 1905).

XIII. Genus: *Catopsilia* Hübner

Catopsilia Hübner, 1823, *Verz.bekannt. Schmett.*: 98.

Catopsilia pomona catilla Fabricius

Catopsilia pomona catilla Crammer, 1779, *Pap. Exot.* 3: 63, pl. 229.

Material examined: Himachal Pradesh: Distt. Una; Santokhgarh, 368m, 1.iv. 2008, 1 ♀, 1 ♂; Basoli, 398m, 31.vii.2008, 4 ♀, 2 ♂, coll. Anita Kumari.

Distribution: Ceylon, India, Burma, Andaman and Nicobar Islands, South China to Solomon Islands and Australia (Talbot, 1939); Santokhgarh, Basoli (H.P.), (present study).

Larval host Plant: *Cassia fistula* (Talbot, 1939).

Catopsilia pomona hilaria Fabricius

Catopsilia pomona hilaria Crammer, 1781 *Pap.Exot.* 4: 95, pl. 339.

Material examined: Himachal Pradesh: Distt. Una; Gagret, 472m, 1.vi. 2008, 2 ♀, 2 ♂; Basoli, 398m, 31.vii.2008, 3 ♀, 1 ♂, coll. Anita Kumari.

Distribution: Ceylon, India, Burma Andaman and Nicobar Islands; South China to Solomon Islands and Australia (Talbot 1939); Gagret, Basoli (H.P.), (present study).

Larval host Plant: *Cassia fistula* (Talbot, 1939).

***Catopsilia pyranthe minna* Linnaeus**

Catopsilia pyranthe minna Linnaeus, 1758. *Syst. Nat. (Edn.x)* 1: 469.

Material examined: Himachal Pradesh: Distt. Una; Daulatpur, 436m, 24.iii. 2008, 1 ♀, 6 ♂; Bangana, 573m, 17.v.2008, 3 ♂, coll. Anita Kumari.

Distribution: Celebes, Baluchistan to Malay Peninsula, Borneo, Sumatra, Java, South China, Formosa, Haonan to Philippines, India. (www.nhm.ac.uk.); Ceylon, India, Burma and Andaman Islands extending to Hainan, Formosa and South China, South and East to Borneo, Java, Celebes and the Philippines. (Talbot, 1939); Daulatpur, Bangana (H.P.), (present study).

Larval host Plant: *Cassia tora*, *Cassia auriculata* (Talbot, 1939).

XIV. Genus: *Cepora* Billberg

Cepora Billberg, 1820, *Enumer. Ins.*: 76.

***Cepora nerissa phryne* Fabricius**

Cepora nerissa phryne Fabricius, 1775, *Syst. Ent.*: 473.

Material examined: Himachal Pradesh: Distt. Una; Amb, 484m, 5.iv. 2008, 6 ♀, 1 ♂, coll. Anita Kumari.

Distribution: N.W. Himalayas (to 4000ft) (www.nhm.ac.uk.); Nepal, Sikkim, Bhutan, Bengal, Assam, upper and lower Burma, Tenasserim, Siam and China (Bingham, 1907); Amb (H.P.), (present study).

Larval host Plant: *Capparis* (Bingham, 1907).

XV. Genus: *Colias* Fabricius

Colias Fabricius, 1807, *Ill. Mag.* 6: 284.

***Colias fieldi edusina* Leech** *Colias fieldi edusina* Leech, 1893, *Butt. China*, 2: 438, pl.35, f: 6,7.

Material examined: Himachal Pradesh: Distt. Una; Haroli, 375m, 1.viii. 2008, 1 ♀, 5 ♂; Dehlan, 374m, 4.viii.2008, 3 ♀, 6 ♂, coll. Anita Kumari.

Distribution: Sikkim to North Burma (2500-14000 ft.) and North Yunnan (www.nhm.ac.uk.); Baluchistan to North Punjab, Sikkim and northern Burma, Western Himalayas (Bingham, 1907); Haroli, Dehlan (H.P.), (present study).

Larval host Plant: Feed on leguminosae, *Trifolium* (Bingham, 1907).

***Colias hyale glicia* Linnaeus**

Colias hyale glicia Linnaeus, 1758, *Syst. Nat. (Edn.x)*, I: 71.

Material examined: Himachal Pradesh: Distt. Una;

Bangana, 573m, 17.v.2008, 1 ♀, 2 ♂, coll. Anita Kumari.

Distribution: North (except South Russia), North Africa. (www.nhm.ac.uk.); Baluchistan, the Himalayas from Chitral, Kashmir to Bhutan and Palaearctic region (Bingham, 1907); Bangana (H.P.), (present study).

Larval host Plant: *Trifolium* (Bingham, 1907).

XVI. Genus: *Delias* Hübner

Delias Hübner, 1820, *Verz. bek. Schmett.*, p.91.

***Delias eucharis* Drury**

Delias eucharis Drury, 1773, *Ill. Ex. Ent.* 2, pl. 10 f.5.

Material examined: Himachal Pradesh: Distt. Una; Chintpurni, 710mm, 7.vi. 2008, 2 ♂; Chauki Maniar, 530mm, 5.vii.2008, 1 ♀, 1 ♂, coll. Anita Kumari.

Distribution: India, Ceylon (Talbot, 1939); Chintpurni, Chauki Maniar (H.P.), (present study).

Larval host Plant: *Loranthus*, *Sisoo*, *Ficus glomerata* (Talbot, 1939).

XVII. Genus: *Eurema* Hübner

Eurema Hübner, 1819, *Verz. bek. Schmett.*: 96.

***Eurema hecabe merguiana* Linnaeus**

Eurema hecabe merguiana Linnaeus, 1758, *Syst. Nat. (Edn.x)*: 470.

Material examined: Himachal Pradesh: Distt. Una; Amb, 484m, 5.iv.2008, 2 ♀, 4 ♂, Basoli 398m.31.vii.2008, 4 ♀, 5 ♂, coll. Anita Kumari.

Distribution: South China, Bengal, Sikkim, Burma, Siam, Lankawi Island, Malay Peninsula (www.nhm.ac.uk.); Spread eastwards to Siam and China, South far into the Malayan Subregion, and to west into parts of Ethiopian Region (Bingham, 1907); Amb, Basoli (H.P.), (present study).

Larval host Plant: *Sesbania aculeate* (a monsoon annual) and *Cassia tora* (Bingham, 1907).

XVIII. Genus: *Ixias* Hübner

Ixias Hübner, 1820, *Verz. bek. Schmett.*: 95.

***Ixias marianne* Crammer**

Ixias marianne Crammer, 1779, *Exot. Ill.* 41: 217.

Material examined: Himachal Pradesh: Distt. Una; Daulatpur, 436m, 24.iii. 2008, 1 ♀, 1 ♂; Amb, 484m, 5.vii.2008, 1 ♂, coll. Anita Kumari.

Distribution: S. India, Ceylon. (www.nhm.ac.uk.); Ceylon to Peninsular, India, Punjab, Kumaon (Talbot, 1939); Daulatpur, Amb (H.P.), (present study).

Larval host Plant: *Capparis sepiaria*, *C. divaricata*, *C. aphylla* and *C. grandis* (Talbot, 1939).

***Ixias pyrene cingalensis* Linnaeus**

Ixias pyrene cingalensis Linnaeus, 1764, *Mus. Ulr.* 241.

Material examined: Himachal Pradesh: Distt. Una; Santokhgarh, 368m, 1.viii.2008, 3 ♂; Chauki Maniar, 530m, 5.vii.2008, 2 ♂; Haroli, 375m, 1.viii.2008, 4 ♂, coll. Anita Kumari.

Distribution: China (www.nhm.ac.uk.); Ceylon (Talbot, 1939); Santokhgarh, Chauki Maniar, Haroli (H.P.), (present study).

Larval host Plant: *Capparidaceae* (Talbot, 1939).

XIX. Genus: *Pieris* Schrank

Pieris Schrank, 1801, *Fauna Boica*, 2, (1):152, 164.

***Pieris brassicae* Linnaeus**

Pieris brassicae Linnaeus, 1758, *Syst.Nat. (Edn.x)*, 467.

Material examined: Himachal Pradesh: Distt. Una; Mubarakpur, 490m, 15.iii.2008, 1 ♀, 3 ♂; Santokhgarh, 368m, 1.iv.2008, 4 ♀, 2 ♂; Bangana, 573m, 17.v.2008, 2 ♀, 3 ♂, coll. Anita Kumari.

Distribution: Europe to Asia Minor (www.nhm.ac.uk.); Europe, Northern Asia Central Asia, Himalayas from Chitral to Bhutan (upto 10,000 feet), North-west India Umballa (Bingham, 1907); Mubarakpur, Santokhgarh, Bangana (H.P.), (present study).

Larval host Plant: *Brassica* plants (Bingham, 1907).

***Pieris mesentima lordaca* Walker**

Pieris mesentima lordaca Walker, 1870, *Entom.*, 5: 48.

Material examined: Himachal Pradesh: Distt. Una; Bangana, 573m, 17.v.2008, 2 ♂; Bharwain, 708m, 17.viii.2008, 2 ♂, coll. Anita Kumari.

Distribution: Himalayas from Kashmir to Sikkim, plains to southern India (Bingham, 1907); Bangana, Bharwain (H.P.)(present study).

Larval host Plant: *Capparidaceae*, *Capparis sepiaria*, *Capparis heyneana*, *Cadaba indica*, *Maerua arenaria* (Talbot, 1939).

Discussion

Twenty-eight species belonging to nineteen genera i.e., *Aglais* Dalman, *Anosia* Hübner, *Ariadne* Horsfield, *Hypolimnas* Hübner, *Junonia* Hübner, *Lethe* Hübner, *Morpho* Fabricius, *Neptis* Fabricius, *Pyronia* Hübner, *Satyrus* Westwood, *Papilio* Linnaeus, *Atella* Doubleday, *Catopsilia* Hübner, *Cepora* Billberg, *Colias* Fabricius, *Delias* Hübner, *Eurema* Hübner, *Ixias* Hübner, *Pieris* Schrank belonging to three families i.e., Nymphalidae, Papilionidae and Pieridae of the superfamily Papilionoidea. Four species such as *Pieris brassicae* Linnaeus, *Papilio demoleus demoleus* Linnaeus, *Catopsilia pomona catilla* Fabricius and *Junonia orithya* Linnaeus are very common in these area.

References

- Arora, G.S. 1990. Collection and Preservation of Animals: Lepidoptera: Zoological Survey Of India, Calcutta 131-138.
- Bell, T.R. 1911. The common butterflies of plain in India. *Journal of Bombay Natural History Society* 20: 1115-1136.
- Bhaskaran, S. and Eswaran, R. 2005. Status and Distribution of Butterfly species in Sivakasi Taluk, Tamilnadu. *Journal of Insect science*. 18 (1): 134-136.
- Bingham, C.T. 1905. The fauna of British India including Ceylon and Burma Butterflies Vol.I. London: Taylor and Francis.
- Bingham, C.T. 1907. The fauna of British India including Ceylon and Burma Butterflies Vol.II. London: Taylor and Francis.
- Common, I.F.B. 1970. Lepidoptera. In: Mackerras, I. M. (ed.). *The Insects of Australia. A Textbook for Students and Research Workers*. 1st edition. Australia: Melbourne University Press.
- D'Abbrera, B. 1980-86. *Butterflies of Oriental region*. Victoria: Hill House.
- D'Abbrera, B. 1998. *The Butterflies of Ceylon*, Victoria: Hill House.
- de Niceville, L. 1881. A list of butterflies taken in Sikkim. *Journal of Asiatic Society Bengal* 1(1): 49-60.
- de Niceville, L. and Marshall, G.E.L. 1882. *The Butterflies of India, Burma and Ceylon*. London: Taylor and Francis.
- de Niceville, L. and Marshall, G.E.L. 1886. *The Butterflies of India, Burma and Ceylon*. London: Taylor and Francis.
- de Niceville, L. and Marshall, G.E.L. 1890. *The Butterflies of India, Burma and Ceylon*. London: Taylor and Francis.
- Gunatheraj, K., Perumal, T.N.A., Jayarama, K. and Kumar, G. 1998. *Some South Indian butterflies; Field guide published under project life scape*, Indian Academy of Sciences, Bangalore: 1-270.
- Hampson, G.F. 1892. *Fauna of British India including Ceylon and Burma, Moths*. Vol.I. London: Taylor and Francis.
- Hampson, G.F. 1895. *Fauna of British India including Ceylon and Burma, Moths*. Vol.IV. London: Taylor and Francis.

- Hampson, G.F. 1918. Some small families of the Lepidoptera. *Novitates Zoologica* 25: 366-394.
- Holloway, J.D., Bradley, J.D. and Carter, D.J. 1992. The Guide of insects of importance to man (Lepidoptera): 1-21.
- Miller, L.D. 1970. Nomenclature of wing veins and cells. *Journal of Research in Lepidoptera* 8(2): 37- 48.
- Moore, F. 1865. On the Lepidopterous insects of Bengal. *Proceedings of Zoological Society of London* 755-823.
- Moore, F. 1866-68. On the Lepidopterous Insects of Bengal. *Proceedings of Zoological Society of London* 1866:755-823; 1867: 44-98; 1868: 612-688.
- Moore, F. 1880-87. The Lepidoptera of Ceylon. London Reeve 3: 215.
- Moore, F. 1890. *Lepidoptera Indica*. Lovell Reeve and Co, 5 London: Henrietta street, Covent Garden.
- Moore, F. 1896-1899. *Lepidoptera Indica*. Lovell Reeve and Co, 5 Limited, Publishers to the hime, Colonial, and Indian governments 6, London: Henrietta street, Covent garden.
- Rose, H.S. and Sharma, N. 1995a. Comments on *Junonia hierta* complex alongwith reporting of a new sub species (Lepidoptera) from West Himalaya. *Actias* (1-2): 63-65.
- Rose, H.S. and Sharma, N. 1995b. Comments on the variations in *Junonia orithya* complex (Lepidoptera: Nymphalidae). *Journal of Bombay Natural History Society* 92(2): 278-280.
- Rose, H.S. and Sharma, N. 1998a. Further studies on the genus *Mycalesis* Hübner (Lepidoptera Papilionoidea: Satyridae). *Annals of Entomology* 16(1): 51-62.
- Rose, H.S. and Sharma, N. 1998b. Two new species of the genus *Ypthima* Hübner from West and North West Himalaya. (Lepidoptera: Papilionoidea: Satyridae). *Geobios New Reports*, 17(2): 105-112.
- Rose, H.S. and Sharma, N. 1998c. Role of genitalia in the identification of *Melanitis* species (Lepidoptera: Satyridae). *Uttar Pradesh Journal of Zoology* 18(2): 81-86.
- Rose, H.S. and Sharma, N. 1998d. Inventory of Satyridae (Rhopalocera: Lepidoptera) of North-West India. *Zoos' Print Journal* 13 (11): 29-30.
- Rose, H.S. and Sharma, N. 1999. Population Status and male genitalic studies on *Lethe europa niladana* and *Parage versmani cashmirensis* (Lepidoptera: Satyridae). *Journal of Bombay Natural History Society* 96 (3): 433-435.
- Rose, H.S. and Sharma, N. 2000a. Fur ther contribution to the taxonomy and distribution of the genus *Lethe Hübner* (Satyridae: Lepidoptera) from North Western Himalaya. *Entomon* 25(2): 129-140.
- Rose, H.S. and Sharma, N. 2000b. Additional notes on a Himalayan Satyrid *Dallacha hygriva* (Moore) (Satyridae, Lepidoptera). *Journal of Bombay Natural History Society*, 97(3): 448-450.
- Rose, H.S. and Sharma, N. 2000c. Distributional record and genitalic studies of four species of *Callerebia* Butler from North-West Himalaya. *Geobios* 27(2-3): 57-64.
- Rose, H.S. and Sidhu, A.K. 1994. Lycaenid butterfly diversity (Lepidoptera) of Mussoorie (Uttar Pradesh) alongwith comments on Wildlife (Protection) Act, 1972. *Cheetal* 33(3-4): 10-16.
- Rose, H.S. and Sidhu, A.K. 1996. Revision of genus *Tarucus* Moore (Lepidoptera: Papilionoidea) from North-West India. *Entomon* 14(2): 69-80.
- Rose, H.S. and Sidhu, A.K. 1997a. Comments on *Freyeria trochylus* complex (Lepidoptera: Papilionoidea: Lycaenidae) *Geobios New Reports* 16(3): 159-163.
- Rose, H.S. and Sidhu, A.K. 1997b. Taxonomic and distributional studies on the subfamily Lycaenidae (Lepidoptera: Papilionoidea: Lycaenidae) from Western Himalaya. *Bioed* 8(1,2): 61-76.
- Rose, H.S. and Sidhu, A.K. 1999. Remarks on the Distribution and identification of seven species from the genera *Rapala* Moore and *Everes* Hübner (Lycaenidae: Lepidoptera). *Proceedings of National Seminar on Insects and Environment* 21-23.
- Rose, H.S. and Sidhu, A.K. 2001. Inventory of the Butterflies of Punjab (Rhopalocera: Lepidoptera). *Bionotes* 3(2): 43-44.
- Rose, H. S. and Walia, V. K. 2003. Inventory of butterfly diversity of Chandigarh. *Bionotes* 5(3): 58-60.
- Talbot, G. 1939. The fauna of British India including Ceylon and Burma Butterflies Vol.I. London: Taylor and Francis.
- Thakur, M.S., Mattu, V.K. and Mehta, H.S. 2006. Studies on the butterflies of Sukhna and catchment area in

- Chandigarh, India. *Journal of Entomological Research* 30(2): 175-178.
- Trigunayat, M.M. 1999. Status survey of butterfly fauna of Keoladeo. National Park, Bharatpur. *Journal of Experimental Zoology* 2(1): 55-57.
- Uniyal, V.P. 2007. Butterflies in the Great Himalayan conservation Landscape in Himachal Pradesh, Western Himalaya. *Entomon* 32(2): 119-127.
- Varshney, R.K. 1993. Index Rhopalocera Indica Part III Genera of butterflies from India and neighbouring countries [Lepidoptera: (A) Papilionidae, Pieridal and Danaidae]. *Oriental Insects* 27: 347-372.
- Varshney, R.K. 1994. Index Rhopalocera Indica Part III. Genera of Butterflies from India and Neighbouring countries [Lepidoptera: (B) Satyridae, Nymphalidae, Libytheidae and Riodinidae]. *Oriental insects* 28: 151-198.
- Varshney, R.K. 1997. Index Rhopalocera Indica and Neighbouring countries [Lepidoptera: (C) Lycaenidae]. *Oriental insects*. 31: 83-138.
- Varshney, R.K. 1998. Faunal diversity in India. ZSI Publication 146-157.
- Withrington, D.K.J. and Veronik, R. 2008. Butterflies (Rhopalocera) of the Croatian islands. *Entomological Gazette* 59(1): 3-25.
- Wynter Blyth, M.A. 1957. Butterflies of Indian region. *Journal of the Bombay Natural History Society* 1-523.
- Yakovlev, R.V. and Nakonechnyi, A.N. 2001. Butterflies (Lepidoptera: Rhopalocera) of Kurai Mt. Ridge (Altai), Russian Entomological Journal 10(2): 179-187.
- Zimmerman, E.C. 1978. *Microlepidoptera Ins. Hawaii*, vol. 9. Honolulu: University Press of Hawaii